

High Performance Space Pump, Phase I

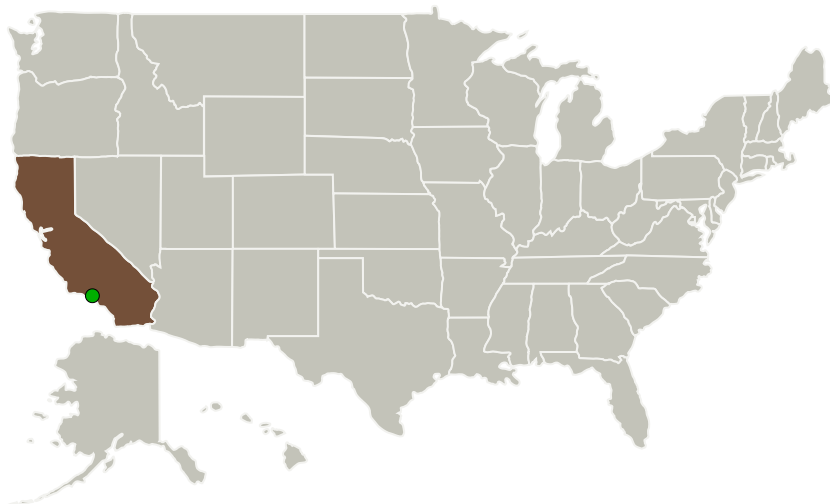
Completed Technology Project (2011 - 2011)



Project Introduction

PDT is proposing a High Performance Space Pump based upon an innovative design using several technologies. The design will use a two-stage impeller, high temperature motor and a next generation sensor-less motor controller to provide several potential system improvements: \ Increased pump delivery pressure (hydraulic HP) would provide greater flow potential and improved heat transfer performance. It also makes possible heat exchanger performance improvements that will allow space and weight reductions that may aid overall vehicle performance. \ Improved overall efficiency resulting from the two-stage impeller reduces vehicle power consumption which may aid overall performance/weight/volume. This results in improved energy efficiency for all applications. \ Future mission requirements will drive fluid temperatures above current pump operating limits. The elimination of hall-effect sensors removes the driving consideration for the maximum operating temperature of PDT's current deep-space rated pump designs. \ The higher operating temperature capability allows flexibility in placing pump within the fluid loop which may offer packaging benefits at the vehicle level. \ Higher pump temperature capability may allow use of alternate coolants at higher radiator operating temperatures. This may provide opportunity to use pumped liquid cooling for high heat flux devices.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Pacific Design Technologies, Inc.	Lead Organization	Industry	Goleta, California
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations

California

Project Transitions

**February 2011:** Project Start**September 2011:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138214>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Pacific Design Technologies, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

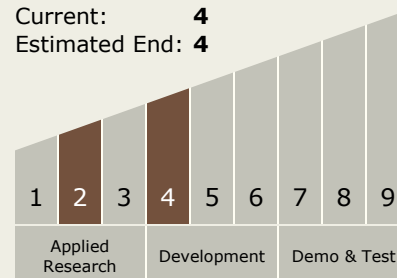
Michael R Brown

Technology Maturity (TRL)

Start: 2

Current: 4

Estimated End: 4



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Technology Areas

Primary:

- TX14 Thermal Management Systems
 - └ TX14.1 Cryogenic Systems
 - └ TX14.1.1 In-space Propellant Storage & Utilization

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System